Reducing the Danger of Nuclear Weapons and Proliferation

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Talk Overview

- Possible paths to nuclear war?
- Proliferation, NPT
- Nuclear weapons abolition?
- Obama's record
- Outlook

Utility of Nuclear Weapons

Pro

- Ended war in Japan
- Saved casualties in WW2
- Prevented WW3 between US & USSR

Con

- Not necessary; were the first step in the cold war
- Needlessly killed Japanese civilians
- European war was not likely without nuclear weapons

Nuclear Weapons Questions

- No nuclear war since 1945 – deterrence, nuclear taboo, luck, or other reasons?
- Does the possession of nuclear weapons make a country more secure?
- Is the present situation stable?
- Is the era of arms control and gradual reduction of nuclear weapons over?
- Should we try to abolish nuclear weapons?
  - Is it possible?

Scientists React to the Bomb

- Lab discussions organized
  - Chicago: Spring 1945
  - Use bomb for demonstration, not on cities
  - Share secret of the bomb
- No secret, no monopoly, no defense, international control required
  - One World or None
- 1945: Bulletin of the Atomic Scientists, Federation of American Scientists
  - Civilian control of atomic energy
- Acheson-Lilienthal plan (Oppenheimer): March 1946
- Baruch plan
  - UN, failure to get agreement
  - collapsed by early 1947

Expectations about the Bomb: 1945

- Atomic Scientists (Oppenheimer, Bohr, Frank, Szilard)
  - It would be so terrifying that a war could be ended but they warned that its use could lead to a nuclear arms race and Armageddon
- Politicians (Churchill, Roosevelt)
  - It would become a powerful influence

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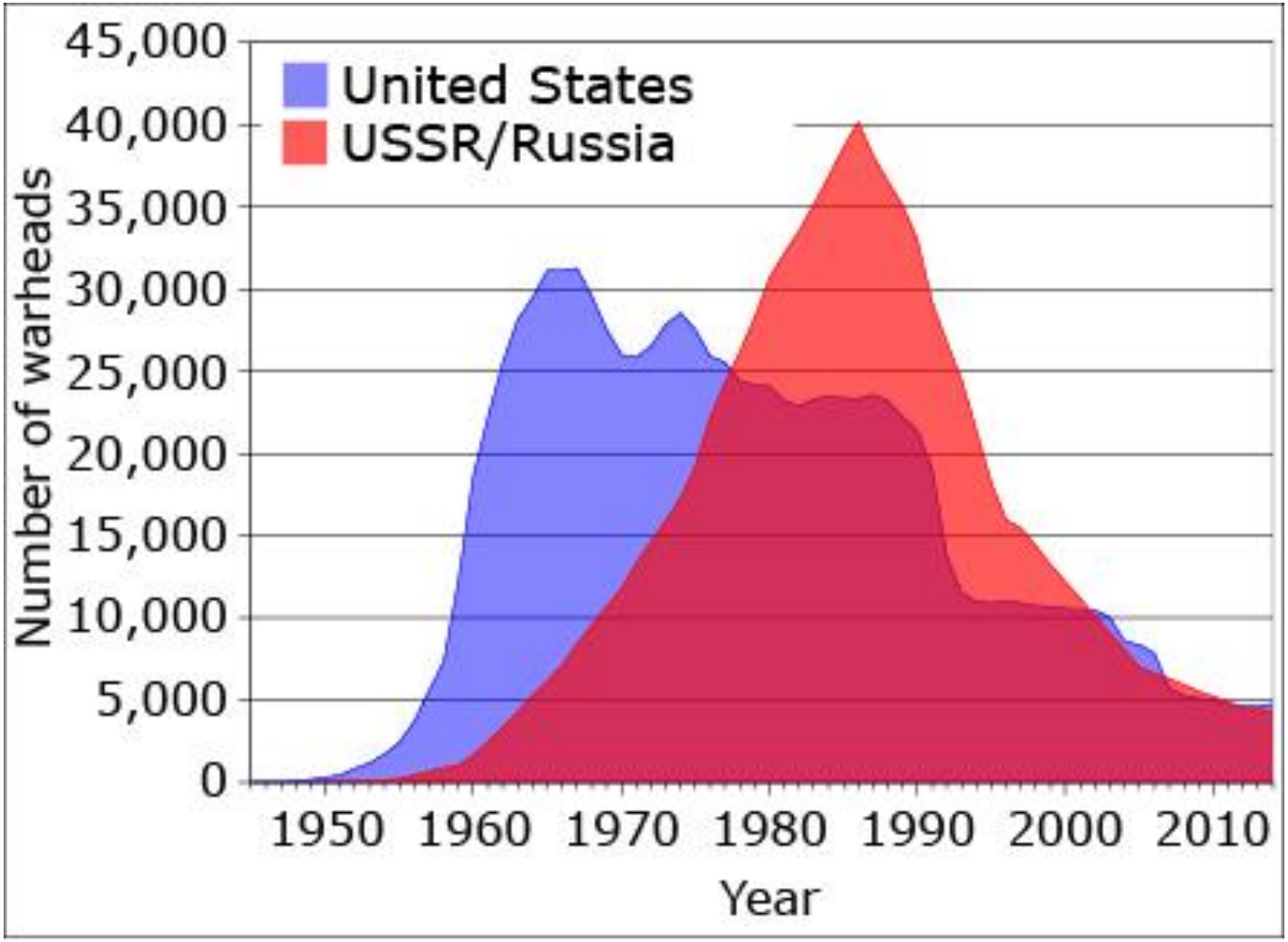
Neither was fully correct

- Its coercive influence has been small
- Possession became a status symbol before NPT
- Deterrence, abhorrence → non-use (nuclear taboo)

Cold War



Courtesy of User: Fastfission on Wikipedia. Image is in the public domain.

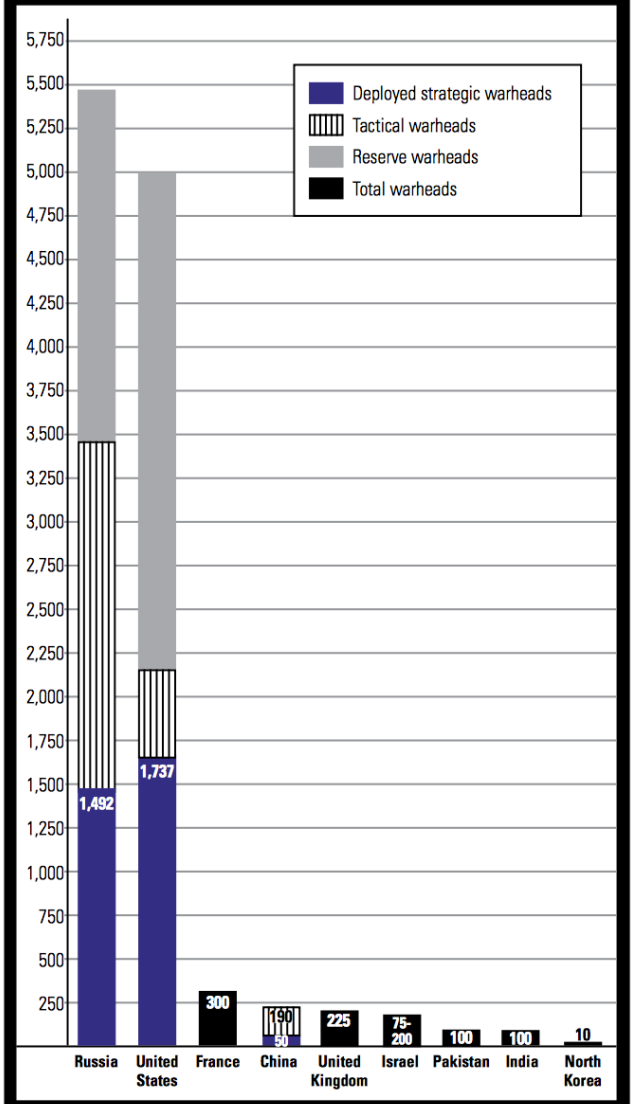
Elwood H. Smith cartoon about the nuclear arms race has been removed due to copyright restrictions.

Trident II Submarines

- 24 D5 missiles: ~ 4 warheads
- Warheads: W76 (100 kT), W88 (300 kT)
  - (Hiroshima: ~15 kT)
- Each sub has ~24x4 = 96 warheads
- Could destroy that many targets
- Delivery time: 15-30 minutes
- Total explosive power > 10 MT
- Total allied bombing in WWII: ~3 MT
- US has 14 subs, England has 4 (~1/2 at sea)

Figure 1: Global Nuclear Stockpiles, 2012

This table provides estimates for the nine countries that possess nuclear weapons. Russia and the United States have strategic, tactical, and reserve warheads. Both countries also have thousands of warheads that have been retired and are planned for dismantlement; those are not included here. China's nuclear warheads are believed to be stored separately from delivery vehicles.



Sources: Arms Control Association; Federation of American Scientists; International Panel on Fissile Materials; U.S. State Department.

Pathways to Nuclear Escalation

- Vulnerability: nuclear weapons + missiles
- **Fear**
- Reliance on deterrence (how much is enough?)

Possible Pathways to War

- Errors/accidents, aggressive deployment [launch on warning] → accidental launch
- Escalation from conventional war
  - Aggressive deployment (India/Pakistan?)
- Rogue commanders/insider theft
- Theft/sale of fissile material → terrorist bomb

The Cold War Legacy

"The President of the United States now for 50 years is followed at all times, 24 hours a day, by a military aide carrying a football that contains the nuclear codes that he would use and be authorized to use in the event of a nuclear attack on the United States. He could launch a kind of devastating attack the world's never seen. He doesn't have to check with anybody. He doesn't have to call the Congress. He doesn't have to check with the courts. He has that authority because of the nature of the world we live in."

Vice President Richard Cheney

Launch on Warning: Accidental Nuclear War?

- US and Russia have ~1000 missiles on alert status
- Delivery times: ~15/30 minutes, SLBM/ICBM based
- Decision times: ~10 minutes
- Probability of error non-negligible (complex systems)
- Each side vulnerable to the other's system
- Russian system less robust
- Each side does it because the other does
- **Jan. 2013: Defense Science Board warned that our command and control system's vulnerability to cyber attack had not been fully assessed**

Nuclear Non-Proliferation Treaty (NPT), 1970

- Limits the spread of nuclear weapons
- Currently 189 countries
  - 5 with nuclear weapons: US, Russia, UK, France, and China
- Israel, India, Pakistan, and North Korea (withdrew 2003) are not parties to the treaty
- Cornerstones
  1. Non-proliferation
  2. **Disarmament: Article VI obligates the nuclear weapons states to work on eliminating their nuclear arsenals**
  3. Right to peacefully use nuclear technology
  4. Reviewed each five years at UN; May 2015

1974 NPT treaty effectiveness?

- 5 nuclear powers committed to disarmament (no schedule): US, Russia, UK, France, China
- 4 nuclear states outside the treaty: Israel (1967), India (1974), Pakistan (1990), North Korea (2006)
- A.Q. Khan Network, Pakistan (now shut down)
- Worries about Iran
- 2 countries have given up bombs (South Africa & Libya)
- Many countries have given up programs: Taiwan, Sweden, Brazil, Australia, Argentina…
- Nuclear capable countries have no weapons: Japan, South Korea, Germany, Canada…
- Fewer countries have bombs than predicted: JFK worried (in 1963) that 15 to 25 would have them
- Political norm is to renounce nuclear weapons and press the haves to disarm!

NPT Problems

- North Korea
  - 1985: signs NPT, resists IAEA inspections
  - 1994-2002: freeze activities, “Agreed Framework”
  - 2006: Test 1, ~0.5 kT
  - 2009, 2013: Tests 2 and 3, few to 10 kT
  - All tests measured by CBTBO
- Iran: signed NPT
  - Enriched activities, problems with IAEA → UN resolutions, sanctions
  - 2013: “First Phase Agreement” & freeze
  - Tough negotiations under way
  - Hard liners in Iran, US pose threat (Menendez-Kirk)

Stormy Weather Predicted: 5-Year NPT Review, UN, May 2015

- Successful 2010 Nuclear Nonproliferation Treaty (NPT) Review Conference
- Follow-through on 22 interrelated disarmament step consensus action plan has been very disappointing
- December 2014, Daryl Kimball ACA

A Nuclear Free World?
Obama's Prague Speech, April 5, 2009

- I state clearly and with conviction America's commitment to seek the peace and security of a world without nuclear weapons.
- This goal will not be reached quickly – perhaps not in my lifetime. It will take patience and persistence. But we must ignore the voices who tell us that the world cannot change.
- As long as these weapons exist, the US will maintain a safe, secure, and effective arsenal to deter any adversary, and guarantee that defense to our allies.

Arguments Against Nuclear Weapons Abolition

- **Dangerous: eliminates deterrence**
- Suggests weakness
- Will not deter Iran, North Korea, …
- Imposes impossible inspection requirements
- **Cannot be achieved**
- Nuclear weapons cannot be un-invented

Deterrence

- Preventing a direct attack on a nuclear armed power
  - This has worked, or at least it never has happened
- Coercive diplomacy [changing unwanted actions]
  - This has almost never worked: Russian takeover of Eastern Europe, Korean War, Chinese bomb…
- Enables brinkmanship: Pakistan/India, Berlin crisis
- Requires showing “resolve” (crisis instability)
- Requires rational and accurate decision makers
- Does not work against an accidental use
- Unlikely to work against terrorists

Deterrence requires small numbers of weapons – more leads to instability (could cause war)

Should We Try to Abolish Nuclear Weapons?

- There is no risk free world!
- The present situation is not stable: we could be lucky for a long time, but we can't be sure
- Fewer nuclear weapons increase safety
- Abolition is a goal worth working towards, even if we don't get there. We have committed ourselves in Article VI of the NPT!

Obama's Record

- Raised hopes in Prague speech
- New Start Treaty
- Improved Nuclear Security (Summits)
- Trying to engage Russia in further steps (difficult)
- Nuclear posture review – only slightly modified
- ~1000 nuclear weapons still on launch on warning (US, Russia)
- North Korea: strategic patience (i.e., neglect the issue)
- Modernizing nuclear weapons, delivery systems

Some Reasons for Optimism

- No nuclear war since 1945
  - Deterrence, nuclear taboo, luck
- NPT working reasonably well
- CTBO in operation: detected ~0.5 kT North Korean test
- Budget constraints in Russia and US may lead to nuclear force reductions
- World wide discussion of zero nuclear weapons
- Look for fireworks at UN May 2015 NPT review
- **Public opinion counts!**

Arms Control Organizations

- Council for a Livable World
  - Nuclear physicist Leo Szilard founded Council for a Livable World in 1962 to deliver "the sweet voice of reason" about nuclear weapons to Congress, the White House, and the American public.
  - A Washington, DC based non-profit, non-partisan advocacy organization dedicated to reducing the danger of nuclear weapons and increasing national security. Our mission is to advocate for sensible national security policies and to help elect congressional candidates who support them.
- The Arms Control Organization (ACA)
  - Founded in 1971, is a national nonpartisan membership organization dedicated to promoting public understanding of and support for effective arms control policies. Through its public education and media programs and its magazine, *Arms Control Today (ACT)*, ACA provides policy makers, the press, and the interested public with authoritative information, analysis, and commentary on arms control proposals, negotiations and agreements, and related national security issues.
- Federation of American Scientists (FAS)
- Peace Action: Grassroots peace network

Nuclear Weapons Questions

- No nuclear war since 1945 – deterrence, nuclear taboo, luck, or other reasons? **[all]**
- Does the possession of nuclear weapons make a country more secure? **[probably not]**
- Is the present situation stable? **[with luck]**
- Is the era of arms control and gradual reduction of nuclear weapons over? **[next few years bleak]**
- Should we abolish nuclear weapons **[we should try]** and is it possible? **[even less likely]**

Conclusions: Plenty of Work to do to Reduce the Danger of Nuclear War

- Deal constructively with Iran and North Korea
- Take weapons off hair-trigger alert
- Russia: resolve ballistic missile defense issue, reduce weapons to ~1000 including tactical, reduce stockpile
- Bring other nuclear powers into discussion
  - Include India, Pakistan, and Israel
- Secure nuclear material
- Fissile material cutoff treaty
- Stockpile stewardship program (maintain, not modernize)
- Use budget constraints to improve nuclear weapons policy
- Speed elimination of retired nuclear weapons
- Pass the CTBT in the US Senate

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